REMARKS

In the Office Action, claims 1-9, 11-14, 22-31, 68-75 and 77-79 are rejected under 35 U.S.C. § 102; and claims 15-17, 31, 34-36, 41-44 and 46-51 are rejected under 35 U.S.C. § 103. Claims 18-21, 37-40, 52-67 and 80-82 have been withdrawn. Applicants believe that the rejections are improper in view of the reasons set forth below.

At the outset, the Patent Office has objected to claims 10, 32, 33 and 45 as being dependent upon a rejected base claim but would be allowable if rewritten in independent form. See, Office Action, page 9. However, claim 33 is in independent form. Therefore, Applicants respectfully submit that claim 33 should be considered allowable as presently pending.

In the Office Action, claims 1-9, 11-14, 22-31, 68-75, and 77-79 have been rejected under 35 U.S.C. § 102. More specifically, claims 1-9, 11-14, 22-28, 30, 31, 68-75 and 77-79 have been rejected in view of U.S. Patent No. 6,320,209 ("Hata"); and claims 1-9, 12-14, 22-29, 68-71, 73-75, 77 and 78 have been rejected in view of U.S. Patent No. 5,981,977 ("Furukawa"). Applicants believe that the anticipation rejections are improper at least for those reasons set forth below.

Of the pending claims at issue with respect to anticipation rejections, claims 1, 22, 31, 68, 78 and 79 are the sole independent claims. Claim 1 recites a semiconductor light-emitting device that includes a substrate with a substrate surface positioned along a substrate surface plane; a crystal layer that includes a crystal surface oriented along a crystal surface plane diagonally intersecting the substrate surface plane; and a first conductive layer, an active layer and a second conductive layer each formed along at least a portion of the crystal surface. Claim 22 recites a semiconductor light-emitting device that includes a substrate with a substrate surface positioned along a substrate surface plane; a crystal layer that includes a crystal layer surface oriented along a crystal surface plane defined as a S-plane which diagonally intersects the substrate surface plane; and a layer of a first conductive type, an active layer and a layer of a second conductive type each formed along the S-plane. Claim 31 recites a semiconductor light-emitting device that includes a substrate with a substrate surface positioned along a substrate surface plane; a crystal layer that includes an approximately hexagonal pyramid and has a face oriented along an S-plane that diagonally intersects the substrate surface plane; and a layer of a first conductive type, an active layer and a layer of a second conductivity type each formed along at least a portion of the approximately hexagonal pyramid. Claim 68 recites a semiconductor light-emitting device that

includes a substrate with a substrate surface oriented along a substrate surface plane; and an active layer formed along at least a portion of a selectively grown crystal layer via a window region along the substrate surface plane such as to be disposed between a first conductive layer and a second conductive layer and oriented along an active layer plane that is not parallel to the substrate surface plane and wherein an area of the active layer is larger than at least one of an area of the window region and a projected area of the crystal layer derived from projecting the crystal layer to the substrate surface plane in a normal direction.

Claim 78 recites a semiconductor light-emitting device that includes a substrate with a substrate surface oriented along a substrate surface plane; and an active layer formed by selective growth such as to be disposed between a first conductive layer and a second conductive layer and oriented along an active layer plane that is not parallel to the substrate surface plane and wherein a portion of the active layer is directed away from the active layer plane towards the substrate. Claim 79 recites a semiconductor light-emitting device that includes a substrate with a substrate surface oriented along a substrate surface plane; and an active layer formed along at least a portion of a selectively grown crystal layer such as to be disposed between a first conductive layer and a second conductive layer and oriented along an active layer plane that is not parallel to the substrate surface plane and wherein an area of the active layer is greater than or equal to a sum of the projected area of the crystal plane derived from projecting the crystal layer to the substrate in a normal direction and an area in which at least one of the conductive layers contacts a respective electrode formed on the substrate.

The semiconductor light-emitting device as claimed provides a number of advantages. For example, the claimed semiconductor light-emitting devices can provide improved light emission efficiency by virtue of desirable crystal properties possessed by the slant or diagonal crystal plane. The light emission efficiency can be increased if current is injected only into the S-plane that has desirable crystal properties owing to its advantageous uptake for indium. See, Specification, page 33, lines 19-28.

Further, the claimed invention can provide an emerging light that is partly reflected by a reflecting plane which is parallel to the slant crystal plane that is formed by selective growth. Reflection can improve the light emergence efficiency, thereby causing the semiconductor light-emitting device to improve in brightness. Since the slant crystal plane as the base of the

reflecting plane can be easily formed by selective growth, the reflecting plane can be obtained by self-forming without additional steps, such as etching. See, specification, page 39, lines 3-10.

Another feature of the claimed invention is that the active layer can have a large area if it is formed by selective growth on a plane slant to the substrate for growth. When the device size is limited, the current injection density per unit can be reduced for the same brightness when the active layer in the device has a larger effective area. Therefore, the device with the larger effective area has improved reliability for the same brightness and increased brightness for the same load on the active layer. See, specification, page 39, lines 11-15.

In contrast, Applicants believe that the cited art is clearly distinguishable from the claimed invention. For example, the clear emphasis of Furukawa relates to an active layer that is effectively buried along with a buffer layer formed above a mask layer. As disclosed in Furukawa, by growing the buffer layer 22 and the active layer 26 selectively inside the opening of the mask layer 18 formed on the substrate and by growing additional layers to bury the entirety and to flatten the surface, a planar-type-buried structure is realized. See, Furukawa, col. 10, lines 30-35; Figs. 6A and 6B. Further, Furukawa provides a mask layer 18 that has a stripe-shaped opening 18A. See, Furukawa, col. 4, lines 38-41. Moreover, since the mask layer 18 is formed around the active layer 20, and the entirety is buried by growth of layers, a so-called internal stripe-shaped planar structure is realized as further disclosed in Furukawa beginning at col. 4, line 65 to col. 5, line 3.

Clearly, Furukawa is distinguishable from the claimed invention, such as further defined in claims 13 and 31 that recite, in part, a crystal layer with a substantially symmetrical hexagonal structure or an approximately hexagonal pyramid shape, respectively. Indeed, Applicants have provided a number of examples that illustrate the various features of the semiconductor light-emitting devices as claimed. For example, Example 3 demonstrates a semiconductor light-emitting device in which the crystal layer in the shape of a hexagonal pyramid is formed within a round opening as the window region 43 of the masking layer 42. See, specification, Example 3, beginning on page 56.

Similar to Furukawa, Hata provides a stripe-shaped conductive selective growth mask. See, Hata, Abstract. Indeed, Hata further provides that a p-type AlGaN current-blocking layer 555 with a rectangular shape can be formed on the stripe of the conductive selective growth mask 504. See, Hata, col. 14, lines 55-60. Thus, both Furukawa and Hata provide semiconductor

devices that have distinguishable structures as compared to the semiconductor light-emitting devices as claimed, such as the semiconductor light-emitting devices with a crystal layer in the shape of a substantially symmetrical hexagonal structure or a hexagonal pyramid as further defined in claims 13 and 31, respectively. Therefore, Applicants believe that Furukawa or Hata fail to anticipate the claimed invention.

Accordingly, Applicants respectfully request that the anticipation rejections be withdrawn.

In the Office Action, claims 15-17, 31, 34-36, 41-44, 46-51 and 76 are rejected under 35 U.S.C. § 103. More specifically, claims 41-44 and 46-51 are rejected in view of Furukawa and further in view of U.S. Patent No. 5,814,839 ("Hosoba"); claims 15-17, 34-36 and 76 are rejected in view of Furukawa and further in view of U.S. Patent No. 5,732,098 ("Nisitani"); and claim 31 is rejected in view of Furukawa and further in view of Tachibana. Thus, the Patent Office primarily relies on Furukawa and further relies on Hosoba, Nisitani, and Tachibana to remedy the deficiencies of same. Applicants believe that the obviousness rejections are improper and thus should be withdrawn.

With respect to the rejection of claims 41-44 and 46-51, claim 41 is the sole independent claim. Claim 41 recites a semiconductor light-emitting device. The device includes a substrate including a substrate surface position along a substrate surface plane; a crystal grown layer formed by selective growth and including a crystal surface oriented along a crystal surface plane that diagonally intersects the substrate surface plane; an active layer which is formed along at least a portion of the crystal grown layer that emits light upon injection of amount of current; and a reflecting region which is formed substantially parallel to the crystal surface plane and reflects at least a portion of light emerging from the active layer. As previously discussed, reflection improves the light emergence efficiency thereby causing the semiconductor light-emitting device to improve in brightness.

In contrast, Applicants believe that Hosaba and Furukawa even if combinable fail to render obvious the claimed invention. At the outset, the primary Furukawa reference is distinguishable from the claimed semiconductor device for substantially the same reasons as discussed above. Indeed, the clear emphasis of Furukawa relates to a semiconductor device that includes an active layer in a buried and flattened state and that further provides a mask layer with

a stripe shape as discussed above. Moreover, Furukawa fails to provide a reflecting region as even admitted by the Patent Office.

Further, Applicants do not believe that the Patent Office can rely solely on Hosaba to remedy the deficiencies of Furukawa. Indeed, the clear emphasis of Hosaba relates to a semiconductor light-emitting device that has a groove-formed region and thus is also distinguishable to the claimed semiconductor device. See, Hosaba, abstract. Thus, Applicants do not believe that one skilled in the art would be inclined to modify Furukawa solely in view of Hosaba to render obvious the claimed subject matter as defined by claims 41-44 and 46-51.

With respect claims 15-17, 34-36 and 76, claims 15, 16, 34 and 35 are the sole independent claims. Claim 15 recites an image display unit that includes a plurality of semiconductor light-emitting devices arranged so as to emit light in response to a signal wherein each of the semiconductor light-emitting devices includes a substrate with a substrate surface positioned along a substrate surface plane, a crystal layer that includes a crystal surface oriented along a crystal surface plane and that diagonally intersects the substrate surface plane and a first conductive layer, an active layer and a second conductive layer each formed along at least a portion of the crystal surface. Claim 16 recites a lighting system with a plurality of semiconductor light-emitting devices having similar features as discussed above. Claims 34 and 35 recite an image display unit and a lighting system, respectively. The image display unit and lighting system include a number of semiconductor light-emitting devices that are arranged so as to emit light in response to a signal wherein each of the semiconductor light-emitting devices includes a substrate with a substrate surface that is positioned along a substrate surface plane, a crystal layer that includes a crystal surface oriented along a crystal surface plane defined as a S-plane which diagonally intersects the substrate surface plane and a first conductive layer, an active layer and a second conductive layer that each are formed along at least a portion of the crystal surface. Claim 76 depends from claim 68 and further recites a number of semiconductor light-emitting devices that are selectively grown such that the active layer thereof is separated from the active layer of adjacent semiconductor light-emitting devices.

In contrast, Furukawa fails to disclose or suggest the claimed invention for substantially the same reasons as discussed above. Again, the Furukawa device has a structure that is distinguishable from the semiconductor light-emitting devices as claimed. As previously discussed, Furukawa provides an active layer that is buried and flattened by additional layers and

further provides a stripe-shaped mask layer. Moreover, Furukawa fails to specify a light-emitting device that is part of a display or lighting system as further recited in claims 15, 16, 34 and 35. Indeed, the "buried structure" as disclosed in Furukawa is clearly distinguishable from a display or lighting system that includes a number of semiconductor light-emitting devices as claimed and as further illustrated, for example, in Fig. 54 and as further described, for example, in the specification in example 10 on pages 70 and 71. Thus, on its own, Furukawa is clearly deficient with respect to the claimed invention.

Further, Applicants do not believe that the Patent Office can rely solely on Nisitani to remedy the deficiencies of Furukawa. Indeed, the Patent Office merely relies on Nisitani for its alleged disclosure with respect to an array with a plurality of light-emitting diode devices that are wired. See, Office Action, page 8. Thus, on its own, Nisitani cannot remedy the deficiencies of Furukawa. Therefore, Applicants do not believe that Furukawa and Nisitani even if combinable render obvious the claimed invention.

With respect to the rejection of claim 31, Furukawa is clearly distinguishable for substantially the same the reasons as discussed above. Further, nowhere does Furukawa provide an active layer that has a hexagonal pyramid shape as claimed and is even admitted by the Patent Office. Moreover, the Patent Office merely relies on Tachibana for its alleged disclosure regarding an array of hexagonal pyramids as the active layer of a nitride-based light-emitting device. Thus, even if combinable, the Patent Office cannot rely solely on Tachibana to remedy the deficiencies of Furukawa.

Based on at least these reasons, Applicants believe that the cited art, even if combinable in any hypothetical combination, is distinguishable from the claimed invention and thus fails to render obvious same. Accordingly, Applicants respectfully request that the obviousness rejections be withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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Dated: June 23, 2004